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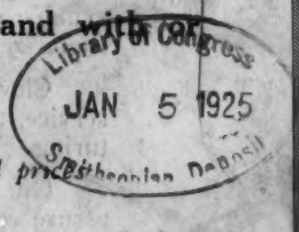

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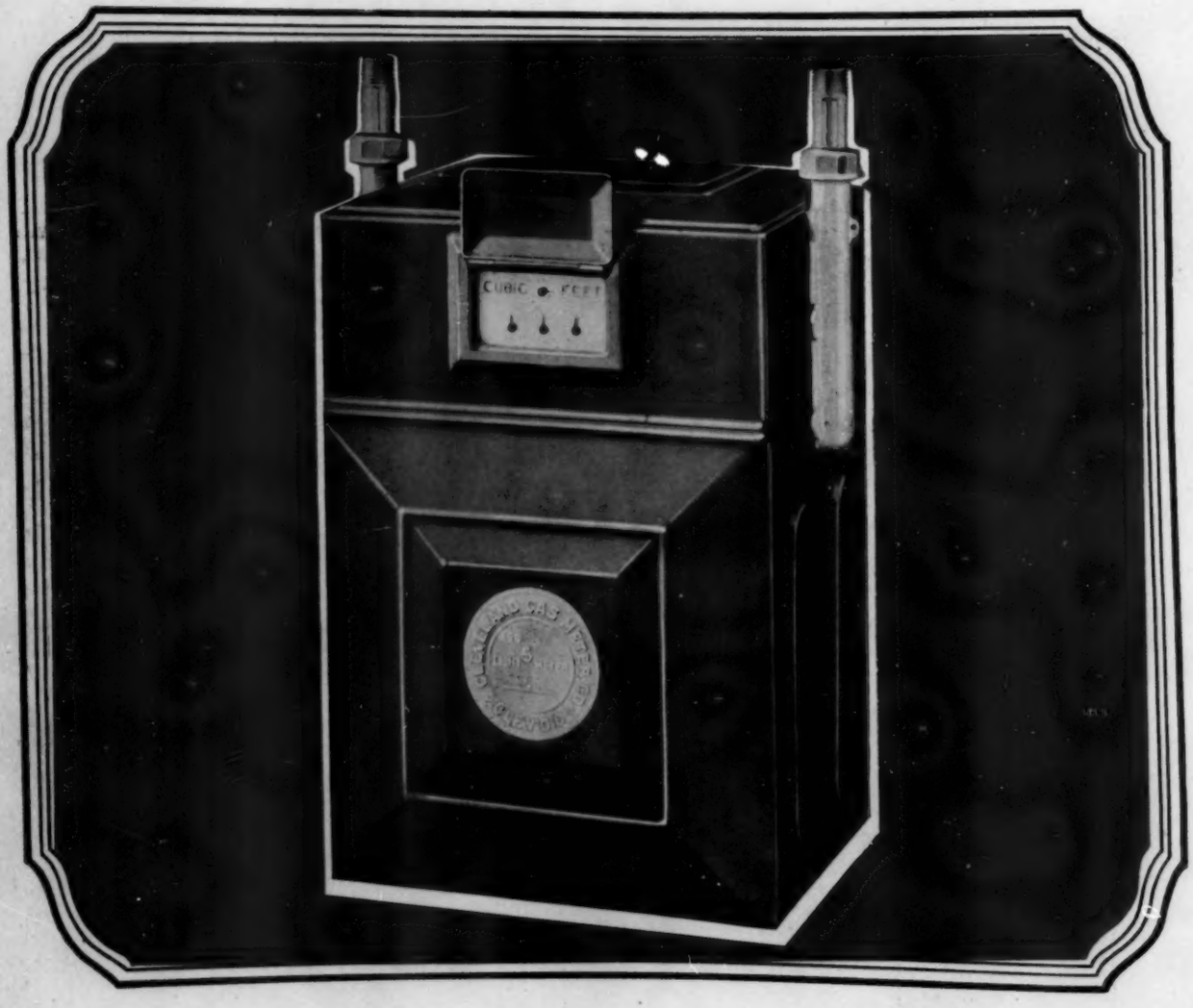

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SIXTY-FIFTH YEAR

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Blue Water Gas

A short historical account

Frank D. Moses

BLUE water gas was first introduced in this country in the seventies and early eighties of the past century at several places, but not until 1887 and 1888 was any organized effort made to introduce it in a commercial way. At that time the Fahnehjelm Incandescent Light Company of Chicago undertook to use it for fuel and lighting. Experimental and demonstrating plants were built at Rogers Park, Ill., and Zanesville, Ohio. Plants were also built at Bellevue, Ky., Jackson, Mich., Chicago, Ill., and St. Joseph Mo.

The Fahnehjelm Burner (Fig. 1) was of Swedish origin and consisted of a number of magnesia needles cemented in a metal arc and suspended over a No. 5 Bray Burner in a holder that could be adjusted in the flame by raising or lowering an adjusting screw. No chimney was used and neither was a Bunsen air mixer, as the high flame temperature of the gas was depended upon to heat the needles (or comb, as the burner was called) to a high state of incandescence, producing a very white light. Burners lasted two or three months.

Faulty Features of Burners

The needles were very frail and would often break off when hot and drop on table or floor. Several fires occurred from this cause. To overcome this trouble, a small glass saucer was arranged to fit on the burner, to catch such needles as might break off.

Complaints were made on the whiteness of the light. Accordingly, the burners were treated in a bath of chemicals, whereupon they were made to give a very bright yellow light which could not be told at a distance from a good carburetted water gas flame.

Blue Water Gas as Fuel

Blue water gas was introduced principally for fuel and some difficulty was experienced in getting a suitable stove for domestic use, as no air could be let in at the Bunsen chamber or air mixer. A gas stove made in Rockford, Ill., was found to have an air shutter that could be shut off tight, and one thousand of these were ordered and installed in any house or apartment for anyone who would pay for 20,000 cubic feet of gas at 50 cents per thousand. This insured the use of the gas for several months, or until the people became familiar with the use of the stove.

Making the Gas

Blue gas was made in a generator (Fig. 2) designed by the company's engineers. It consisted of a shell about 22 feet high, the lower part being about 9 feet in diameter and 10 feet high, above which the shell was elliptical (and about 9x13 feet) with a sectional retort 6 feet by 3 feet at the bottom, 18 inches round at the top and about 12 feet high.

After a fire was started in the bottom chamber, which was filled with coke up to the retort, the retort was filled with soft coal and air-blast admitted under the grate bars. Air was also admitted under the checker brick around the retort, burning the producer gas from the coke in the bottom chamber, the heat being used for heating the checker work and retort to a high heat, and coking the coal in the retort.

The machine was operated the same as a blue water gas machine of today, the soft coal working very well and making good gas. The use of soft coal, however, was soon given up and coke substituted, as it was found that there was a considerable amount of hydrocarbons evolved in making the gas. This was distilled from the soft coal and, mixed with the blue gas, would not work well on the gas burner combs. The hydrocarbons also blackened the cooking utensils, as no air was admitted at the regular air mixers, and the air used in the combustion of the

gas had to be acquired at the burner on point of ignition.

Gas made from soft coal had quite a distinct odor, whereas gas made from coke had no odor that could

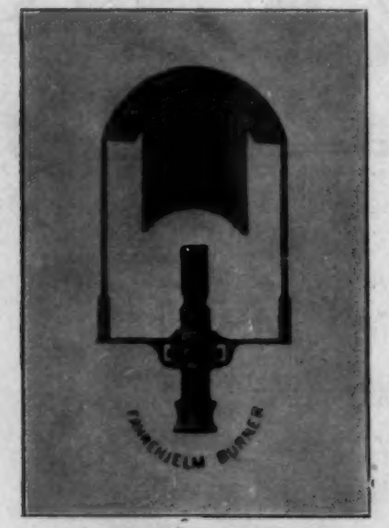


Fig. 1—The Fahnehjelm Burner

be detected by those not accustomed to it, and many accidents were caused by this fact.

The Four Retort Machine

Another design of soft coal machine (Fig. 3) was also used with some success, in which four retorts were used.

Water gas was tried for house heating and

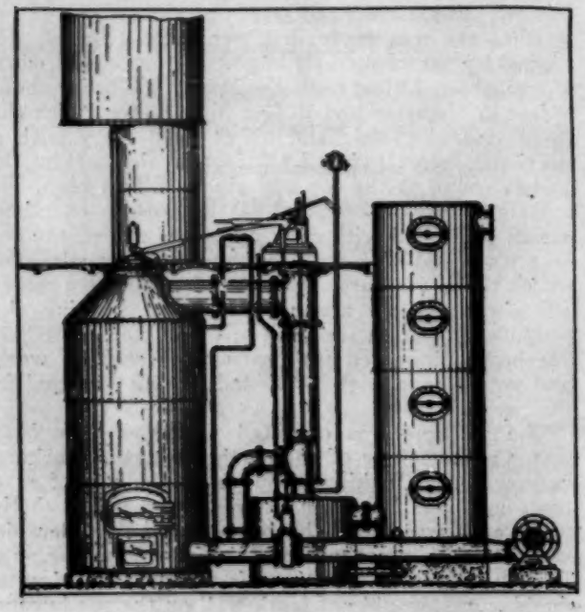


Fig. 4—Original Delwick Machine

worked very well, except where a large amount was used in a very cold room, when, owing to the large amount of hydrogen in the gas (51 per cent) a considerable amount of water was obtained in the products of combustion, which condensed on the walls or any cold article of furniture. However, there was no odor in the products of combustion, the CO burning to CO_2 and the H_2 burning to H_2O, the gas having been carefully purified of all sulphur compounds.

The Fahnehjelm Company built and operated large plants in Chicago, Jackson and St. Joseph for several years and sold gas for about 50 cents per thousand cubic feet, but owing to the fact that the gas

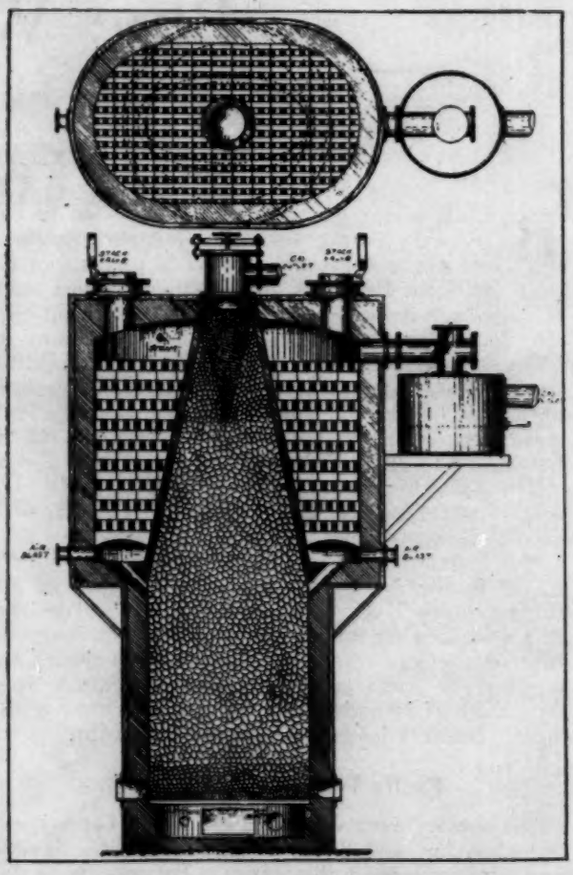


Fig. 2—A Blue Gas Generator

was odorless many fatal accidents occurred and as gas oil was selling for from 2 to 3 cents per gallon, blue gas could not compete with carburetted water gas. Its use was discontinued and the Fahnehjelm plants were turned into illuminating gas works.

During the several years of operating these blue gas plants considerable experience was gained in the use of blue gas for domestic and industrial purposes.

(Continued on page 18)

GAS MERCHANDISING

Domestic – Industrial

Ideas for the Man Who Sells

Tie in your newspaper advertising with the national advertising of the manufacturer

Wm. H. Matlack

GAS men all over the country are tieing up their newspaper advertising with the manufacturer's national advertising. In a great many cases the gas company uses mats or electros furnished by the manufacturer, while in others the gas man has followed the lead taken by other advertisers and writes his own advertising. The Consolidated Gas, Electric Light and Power Company, Baltimore, the Illinois Power and Light Corporation, the Kansas Gas and Electric Company, the Pacific Gas and Electric Company and the Public Service Company of Northern Illinois all have been producing original advertising that ties up with the national advertising being done by the manufacturer, while at the same time it maintains a certain stamp of individuality that makes it stand out from the page and attract the prospective users of gas service. As we view it, the advertisements of any one of these companies is well worth study by the gas man who contemplates the employment of continuous, consistent advertising to sell appliances or service. All of the advertisements of the above-named companies show evidences of being designed and written by men who not only know the gas business, but who know advertising as well.

The Doings of the Dills

"Daddy" Dill is Dumpy until Dolly Dill Decides to Deal with the Gas Man.

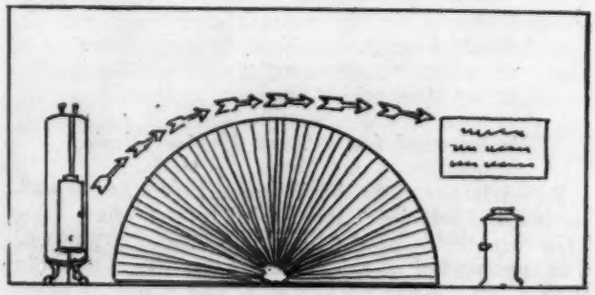
Direct Mail Secures Results

Down in the tropics, in Florida, in Tampa, to be exact, where the balmy breezes blow warm almost all the time, there is a gas man who has faith in what he has to sell and, notwithstanding the fact that everyone says, "Why, we do not need heat down here," took the bull by the horns and went out selling the idea of gas steam heat by sending out 800 letters to people who, in his mind, might find use for a little heat during the early morning or late evening. The results, to quote Thomas Allen of Tampa, the man who is conducting this direct mail campaigning, were "an average of 25 calls a day since mailing the letters, and so far the calls have resulted in the sale of about 80 radiators. I have estimates out now on ten installations that are practically sure to go through—all of them homes, some of the finest in the city, except two, which are big church jobs."

This goes to show how a man who plans his work and works his plan can develop business, notwithstanding time or clime. We have frequently advocated the use of the personalized letter in the columns of the Journal, and we stick to our story that it is a mighty effective medium "as is' 'and should be used to strengthen the dealer's newspaper advertising.

The Window Background Is Half the Display

When decorating a show window, the background is often neglected, and to this writer's mind this is a great mistake and, while experience has taught us that it is sometimes pretty hard to make an effective display with gas appliances, on the other hand,



there is no reason why it cannot be done, even by the small company that may think it cannot afford to spend money on window properties and scenery.

Folks are always interested in home appliances that are tastefully displayed, and the average stock of appliances carried by even the smaller gas company is ample to permit a weekly change of window display if someone is detailed to keep the window freshly decorated.

Here we hear you say: "What can you do with ranges and water heaters?" We have asked the same question ourselves and admit for a time it looked very much as though there was no answer, yet we decided to have a look about before giving up, with the result that we found that a range display was always an attention-getter if it was set in the proper setting.

Building the Background

Our first attempt to give our range window a look that was different was attempted back in 1915. We had one of the boys in the shop build a huge wooden frame and into this frame we fitted a cabinet range with a background of black sateen and, much to our surprise, it attracted a lot of attention. The back-

ground did the trick, for we had displayed the same range in the same window several times before without so much as arresting the attention of a single person. When we discovered that display was largely a matter of background, we began to make a study of background and have used it to attract attention to our merchandise ever since. In making this study we have ascertained that a gas range that is all black stands out better if the background is either orange, green, light blue or white, and that the color of cards used in connection with the display are as named. If, on the other hand, your gas range is white enameled, you may use lighter shades of red, orange, light blue or bright green. When you display room heaters, the background should signify warmth and cheer and the color should be red or yellow or a combination of the two colors, never using green, which signifies coolness, or blue, which suggests cold.

Background for a Tank Heater Display

Recently we saw a background that was very effective and which we have tried to reproduce here. This display featured a timer for tank heaters and was constructed as shown in the sketch. The main (half-moon effect) background was made of black cloth and orange crepe paper, stretched from a common center, forming a rosette which had as a border a narrow strip giving the half-moon effect, while a circulating gas water heater with the timing device was connected to a tank in the left-hand side of the window. Small arrows ran from the timer above the main central background to a display card on the extreme left-hand side of the window, which told the story of "Hot Water Service" automatically controlled from the kitchen.

The simplicity of a display of this type is very effective, especially when the background is so designed to flag folks long enough to get the main idea over.

Hardware Dealer Halts 'Em

We recently heard of a hardware dealer in Pennsylvania who sold a fair-sized quota of gas ranges by building a window floor and background of black and white around all white gas ranges. Black and white always make a good contrast, one which is bound to arrest attention, and it is especially pleasing when all other windows are, as a rule, dressed up in gay colors.

It Has Been Said

The commercial man is coming into his own. Men higher up in the industry now appreciate that all other branches of the gas industry are subservient to sales of appliances. If no appliances were sold to utilize the commodity, gas, there would be no need for gas that we can think of, save to float air boats and toy balloons. It is with this thought in mind that we say, "Keep it up, fellers," and selling will sell. One of these days the rewards will be greater, for you are selling the idea that the commercial man, new business man or whatever he may be called, has Stutz, bear-cat ambitions, too, and that, as he is the man who gets the money on the mahogany, his ambitions are just, reasonable, and that he who sells shall be rewarded.

Capitalizing Blue Monday

The gas men down in North Carolina are endeavoring to determine who can invent the greatest number of novel schemes to induce folks to discard their old style gas ranges and purchase new ones.

Recently several companies cashed in on "Black Friday" and "Friday, the 13th," sales; then came the Concord and Kannopolis Gas Company, Concord, N. C., with a big one-day sale on "Blue Monday." On this day purchasers of gas ranges were given the option of: 1—A $20 allowance on their old gas range, 2—securing an all white enameled kitchen table, free, or, 3—receiving a circulating type, gas water heater, free with the purchase of a new range.

The one-day feature and the premium offer were decided upon to put over quickly a new range the company successfully merchandised recently at their Gastonia plant.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 52

Change of State *(continued)*

Specific Heat of Gases

It has been shown that all substances are affected by heat in that their cubical volume is changed. Solids expand with heat and so do liquids, but the amount of expansion that takes place is small in both cases and need not be considered as far as specific heat is concerned. But this is not so in the case of gases. When a gas is heated, it expands, and when it is cool it contracts. On the other hand, when a certain volume of gas is placed in a cylinder and pressure is applied to the piston, the gas will be contracted, and, as it contracts, its temperature will be raised. For a certain amount of work is performed on the gas, and this work is partially converted into heat. Then, again, when a gas is allowed to expand, its temperature will be reduced. The energy, which is necessary to compensate for the external work done in allowing the gas to expand, that is, permitting the same weight of gas to occupy greater volume, must be supplied from the gas itself, if it is not derived from outside sources. Hence the temperature of the gas is lowered.

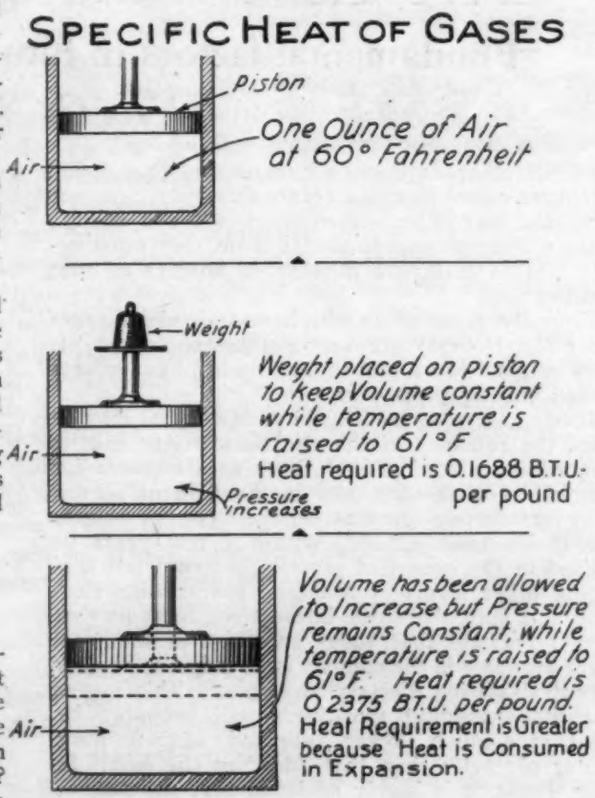
It therefore follows that when a gas is heated and its volume is not permitted to change, its pressure must rise, and a smaller amount of heat energy is required to effect a given rise in temperature than when it is allowed to expand and perform external work at the same time. The external work is simply the effort of pushing back the air surrounding the gas when the latter changes its volume. This necessarily consumes energy and must be supplied from some source.

Two Specific Heats of a Gas

Thus, in discussing the specific heat of a gas—the number of heat units that are rendered to effect a unit temperature rise in a unit quantity of the gas—the manner in which the gas behaves must be taken into consideration. Does the volume remain constant while the pressure increases or decreases? In other words, there are two specific heats of a gas, one for constant volume and the other for constant pressure.

Fundamental Difference Between Them

If the volume remains constant, then no energy is expended in doing external work, and the heat that is added to the gas is all consumed in elevating temperature. On the other hand, if the gas expands and the pressure remains constant, it is evident that a certain amount of energy is consumed in the work


SPECIFIC HEAT OF GASES
Piston
One Ounce of Air at 60° Fahrenheit
Air
Weight
Weight placed on piston to keep Volume constant while temperature is raised to 61°F
Heat required is 0.1688 B.T.U. per pound
Air
Pressure increases
Volume has been allowed to Increase but Pressure remains Constant, while temperature is raised to 61°F. Heat required is 0.2375 B.T.U. per pound.
Heat Requirement is Greater because Heat is Consumed in Expansion.
Air

done by the expansion of the gas against the air. Hence it is clear that the specific heat of a gas at constant volume, with no outside consumption of energy, is less than that at constant volume, in which case more heat energy must be added to the gas to effect the same rise in temperature.

Thus, for example, in the case of air, the specific heat at constant volume is only 0.1688 compared with that at constant pressure of 0.2375. In other words, one unit weight of air will require 0.2375 of a British thermal unit to raise its temperature one degree Fahrenheit when the pressure is maintained constant, but only 0.1688 of a British thermal unit, when the volume is maintained constant, will effect the same temperature rise.

Graphical Representation of Specific Heat

Perhaps this essential relationship between the specific heats of a gas can be better understood from the graphical representation which is given below. The cylinder shown contains one unit weight of air in both cases. If heat is applied to the air, which is assumed to have a starting temperature of 60 degrees F. and the volume of the gas is kept constant by the application of external pressure on the piston, then, as before, only 0.1688 of a British thermal unit will be required to raise the temperature of the air to 61 degrees C.

In the second class the piston is allowed to move outwards while the pressure is maintained constant and the volume increases. The expansion of the air is accordingly conducted against the pressure of the atmosphere. Naturally a certain amount of energy must be consumed in effecting this expansion and this energy must come from somewhere. It can only come from the heat contained in the substance and from that which is added to it in order to effect a temperature rise to 61 degrees F. Hence the heat consumed in bringing this about is 0.2375 of a British thermal unit, or 0.0687 of a British thermal unit greater than what is required to effect the same change in temperature while the volume remained constant.

The Essentials of Gas Progress

Fundamental factors in future development discussed

F. C. Weber

THE other day, when I mentioned that I had been asked to speak before this body, someone said that if an organization is brave enough to ask a Doherty man to talk to them, they must expect him to feature a number of hobbies of that organization.

Naturally, those of us who have trained for years under Mr. Doherty are very enthusiastic about his many original ideas, and constantly bend our efforts toward putting them over.

Nearly every day we hear or read of what may be called the romance of the electric industry and its tremendous rate of growth, both as a medium for household convenience, and in the field of power. Many uninformed persons believe that the slogen, "Do It Electrically," will within a few years be realized to the extent of practically completely displacing other forms of heat and power with electricity. It may, therefore, interest you to know that surveys indicate that about one-third of the total power available in the country is already on the lines of central station electric companies. This means that the remaining two-thirds will probably be added at a much slower rate and against much greater obstacles than that added in the past. In other words, it is highly probable that the rate of growth of the electric industry will be on a decreasing rather than an increasing percentage. Furthermore, even electrical engineers concede that electricity cannot compete with gas and other fuels as a general medium of heat.

Heat Requirements Ten Times the Power

I do not want to appear critical of the electrical industry, but I mention the above facts to present to you a contrast. I believe that it is very conservative to say that the heat requirements of the nation are at least ten times the power requirements. The potential field of the gas industry is therefore at least ten times the potential field of the electric. Furthermore, the present amount of manufactured gas sold could be increased by eighty times if all coal now used were displaced with gas.

Three Essential Features

At least three factors are essential to the success of progress toward the attainment of this potential possibility.

1. We must be able to make gas cheap.
2. To make cheap gas we must have flexibility and latitude in standards of quality.
3. To sell this gas at a profit and also protect

(Continued on page 16)

*Delivered before the annual meeting of the Pennsylvania Gas Association.

As The Journal Views It

THE GAS EMPLOYEE

In a recent issue of The American Gas Journal there was published an article on the gas employee which is fraught with vital interest to all gas men. It was concerned with the "sweetening of our employees," a matter of real consequence to any business executive and of extraordinary significance to the gas executive.

In the enthusiasm that followed the advent of machinery and the great effect it had on the increase in production of merchandise and the astounding development culminating in the large enterprises of the present day, it has often been lost sight of, but the human element is still a very potent factor in the modern business world. There can be no machine so perfect or so automatic that it will not require the human hand to guide it. There can be no organization so finely constituted or so effective in its workings which is not dependent on human good will and co-operation.

In other words, the element of human labor is today, as it has always been, one of prime importance in the industrial world, in spite of the marvelous development in methods and means of manufacture and organization. And there is perhaps today no phase of industry that is so neglected as the human phase.

We simply mean that there are far too many "sour" employees today and far too little attention paid to them. A sour, disgruntled, dissatisfied and unhappy employee is a direct economic loss. This loss has been sometimes called the pay-roll waste.

Economists tell us that the pay-roll waste in this country today represents a stupendous sum, greater than the value of exports—a loss which is directly due to the fact that employers are not getting value at a hundred cents on the dollar from the wages and salaries paid to employees. And still adequate attention is far from being paid to eliminating this waste.

The loss caused by the "sour" employee is due to the lack of proper interest on his part in his work. The average employee is known to do only as much work as is necessary for him to hold his job. He must be educated to see the error of his ways and if he is beyond such enlightenment he must not be permitted to remain in the organization.

But it is to the gas industry that this matter is of most vital importance. An incurably discontented employee may be bad enough in any industry, but he is positively harmful and undesirable in a public utility organization. In his contract with the public, in his manner of acting towards the utility customer, in his talk with his friends and acquaintances and chance-meet strangers, either sub-consciously or with deliberate intent, he may say and do things to hurt the interests of the utility organization with which he is connected. And those who have been concerned with building good will well know how easily this can be done. This is the great danger and the peculiar significance that the "sour" employee has for the utility industries. Not only does he not give due return for value received, but he does injury as well to his company. It is fortunate for the gas industry that its employees are of high calibre, are thoroughly interested in their work, are loyal above everything else and are aware of the trust that is placed upon them by a public that frequently does not appreciate their work, but is instantly ready to find fault if there is a sudden interruption in it.

So the gas utility cannot be said to be afflicted with an abundance of "sour," dissatisfied and harmful employees. But there are some, to be sure. There are some in every organization and something must be done to cope with the problem.

It is not for us to say what form the "sweetening of sour employees" should take. Conditions within each individual organization will determine that largely. But these employees should be given attention and that attention should not be unkindly, but should take the form of explaining misunderstandings and teaching them how better to perform their tasks, how to cease being disgruntled, how finally to develop into a truly important and dependable factor in the gas organization, a veritable useful and desirable member of society, a good American citizen.

GAS WRINKLES

Gas Holder Patches

THE first case covers putting on a complete patch to repair a ragged tear made in the side of a holder by a piece of iron blown through it, the result of a boiler explosion near by.

The rent that was made is shown at A. This was for the moment stopped by overalls, rags and waste, stuffed into the hole. A better temporary patch was then made by a square of canvas dipped into the stickiest kind of varnish, plastered over the hole, and held in place against the gas pressure by ropes run diagonally over it, from the bottom guide rollers to those on the crown. These ropes were stretched out taut as far as possible, and boards, etc., inserted and wedged between them and the canvas, the tension of the ropes crowding the boards and canvas tightly against the holder sheeting.

In the meantime, the permanent patch B, a sheet iron plate of suitable size, was being gotten out. Its exact size, and the exact location of every bolt in it, was then laid out on the holder sheeting around the rent, as indicated by the dotted line.

The holes were drilled by a "breast" hand drilling machine and twist drills, and as each one was finished, small wooden pegs previously prepared (the exact size of the holes) were driven in them, to prevent escape of gas into the face of the workman drilling.

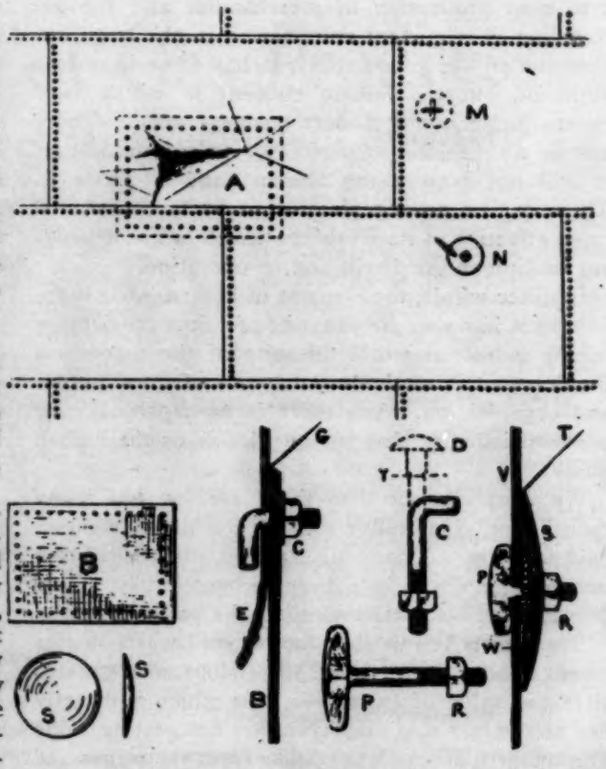
On the joints of the holder sheets where the heads of the old rivets would interfere with the patch B being drawn up so tightly against the sheets E, the rivets were cut off, the shanks knocked inside of the holder, and the holes so left, filled by pegs in the same manner as the new holes.

When all holes were drilled, the boards were removed and the new patch placed in position (without removing the canvas) and secured by the small knee bolts shown at C. These bolts were ordinary "carriage bolts," bought at the local hardware store, with the heads D cut off at Y, and the ends bent at a right angle as shown. The bolts being slightly smaller in diameter than the holes were dexterously slipped through the thin sheets into position, one after another. A string G, attached to each, prevented them from being pushed in, and falling inside, when starting to put the nut on. After all were in position, wicking and red lead was packed in between the sheet E and the plate B, and a washer was provided for each bolt. Upon screwing up the nuts a permanent joint was secured and a patch that will last as long as the holder.

To insure the job being done quickly and successfully, everything was prepared beforehand, and two men worked together on it.

The second case is that of a "pin hole" from rust in an old holder stopped by small plates attached in the same manner.

Wherever a rust hole or small leak in the sheets V was found, it was enlarged by driving a chisel through it, forming an oblong hole, or a narrow slot, in the sheet, as at M. A bolt was then slipped in as before, given a quarter turn, and retained by a string, T; a circular disc, S, slightly concave (the better to retain wicking or packing, W, beneath, previously stuck on it) was then slipped over, the nut



tightened and a permanent patch secured, in appearance as at N.

In this latter instance the bolts used, R, were ordinary square headed bolts with the heads flattened out into a thin oblong "tee" head as at P.

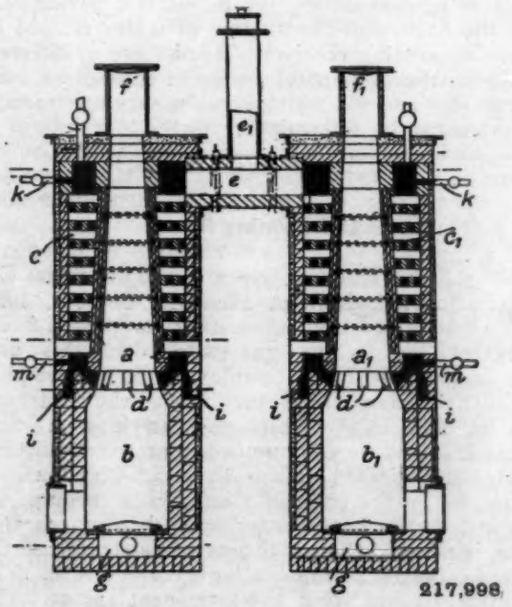
After all was in position any bolt ends projecting out very far from the holder, and liable to interfere with the "cupping," were sawn off with a "hacksaw."

PROGRESS IN GAS TECHNOLOGY

Domestic and Foreign

Combined Retort and Generator System for Gas Making

TWO vertical retorts, a, a^1, are arranged above two water gas generators, b, b^1, and each is provided with the interior of the retorts at their junction with the generators. The upper ends of the jackets communicate through a pipe e having a gas outlet e^1. The retorts have valve controlled outlets f, f^1. The base of each generator b, b^1 is provided with three pipes, for admitting air and steam, and for the outlet of gas respectively. Secondary air may be supplied to the jackets through an annular passage i, and steam may the coal gas separately from the blow gas. The air blast is then shut off, and steam admitted to the a jacket, c, c^1, containing the usual checker work and connected at its lower end through ports d with passage e to the jacket c^1 of the retort a^1. The gas passes through the ports d into that retort, and mixes with the coal gas generated therein so that a mixed water gas and coal gas is drawn off at the outlet f^1. After an interval the generators are blown again and steam is then supplied to the generator b^1 only, to generate water gas. By this method a better gasification of the tar and hydrocarbons is obtained, yielding a richer gas. To produce a gas rich in hydrogen and low in methane and other hydrocarbons, the mixed water gas and coal gas, instead of passing upwards through the second retort, is passed downwards through the corresponding generator to the gas outlet at the bottom, so that the coal gas from the retort also passes downwards through the generator and becomes cracked, yielding hydrogen and methane. The proportion of hydrogen may be increased by injecting oil or other hydrocarbons into the second retort.—British Patent No. 217,998.



217,998

f^1 are closed, but they may be opened to draw off be admitted through pipes k at the top and m at the bottom. The retorts contain coal and the generators contain coke derived from the coal. Air is admitted to the base g of both generators simultaneously, and the resulting blow gas escapes through the ports d into the jackets c, c^1, and thence through the outlet e, e^1. During the blow, the outlet pipes f, through the ports d into the jackets c, together with coal gas from the retorts, and then through the

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Classifying Coal According to Coking Capacity

A SERIES of experiments were carried out in the laboratory of the Stockholm Gas Works to evolve a system of classification of coal according to the coking capacity. The results of these experiments were published in Das Gas und Wasserfach, 1924, page 728.

Coal has been classified according to its geological age, to the length of the flame obtained in its combustion and to its behavior during gasification. All these methods have, however, been found wanting, due to the impossibility of obtaining a continuous series of important characteristics in these systems of classification. The classification of coal according to its coking power has, however, been found to apply to all coals, no matter what their source happens to be, and the author has developed a method for establishing this property which possesses important advantages.

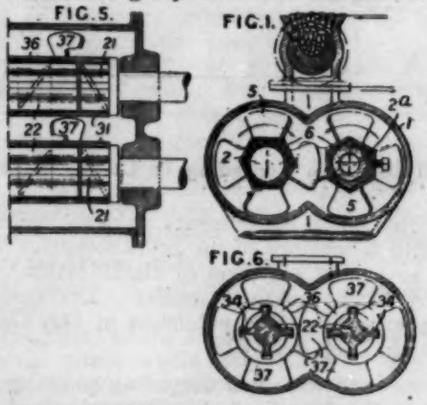
The testing is carried out in apparatus, as is shown in the figure, the heating of the same being accomplished by the aid of electricity. (The original article contains a detailed description of the process.) The method was also found to be very useful in identifying the coal. The time of testing was about seven hours, and the advantages that are to be gained from this method may be summarized as follows:

1. It is easy to tell by this method whether a coal is suited or not for coking purposes.

2. The coal is rapidly identified.
3. It is possible to determine other importa properties of the coal by this method, which properties have an important bearing on the gasification process. Such properties as ease of gasification capacity for swelling, porosity, etc., are established by this method.
4. It is also possible to test out by this method the action of different temperatures of gasification and the time of gasification on the character of the coke.
5. It can also be determined if the coking capacity of the coal is affected by storage.

Carbonizing Retorts

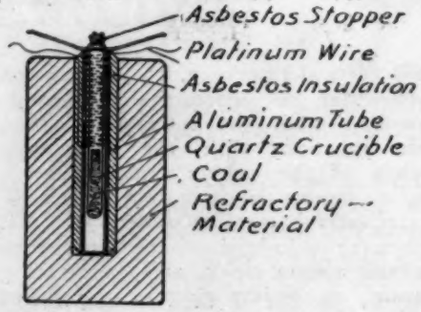
IN British Patent No. 221,679 there is described a retort which is employed for the manufacture of gas. In this retort solid fuels are carbonized. This retort, as may be seen from the accompanying figure, consists of two cylinders with parallel, horizontal axes, the cross-section of the retort, 1, being in the form of a figure 8. Two parallel rotary shafts, 2 and 2a, with axes respectively situated slightly below the axes of the two



cylinders, preferably consist of a number of cross-shaped pieces, 21, 22 (figure 5), which are arranged in line with each other at suitable intervals, and which are coupled together by internally grooved rings, 36, each carrying a blade, 37. The blades are fixed obliquely, and act as an Archimedean screw, transporting the fuel along the retort, and constantly tending to move it towards the outer walls of the retort adjacent to the furnace. The arrangement permits of the shafts becoming deformed and adapting themselves to the shape of the lower portion of the retort with the object of preventing retort carbon from accumulating thereon.

Automatic Determination of Water in Coal, Tar and Oil

THE apparatus that is used in the determination of the amount of water in these substances, containing varying amounts of water, consists of a round bottomed flask, which contains the material and the substance xylene. This flask is fitted with a ground glass stopper, through which passes the distillation tube. The latter tube is fitted with a ground glass joint to permit its removal and is curved over to a water jacketed worm condenser. The end of the condenser passes through a cork into a glass jacket which is superimposed on



COKING FURNACE

the stopper of the flask, with which it communicates by a narrow tube leading to the bottom of the flask. In the jacket is placed the measuring receiver resting on supports. Any excess condensate which is formed during the distillation passes back into the flask, and the volume of water is read off on the measuring receiver. By the use of different receivers, the amount of water in substances, such as coal, tar and oil, which contain varying amounts of water, can be determined.

Dehydrating Tar

A RECENT article, appearing in the Swiss Gas Journal, Bulletin Mensuel, October, 1924, describes an interesting method of dehydrating tar in the gas works. In this process waste heat is employed to accomplish the dehydration. The tar from the washers, etc., is left in the pits for as long a time as possible, and then is pumped to an overhead tank which holds 25,000 liters, or about 5,500 gallons. A steam pipe in the form of a coil is run through the tank and the tar in the latter, and when superheated steam is allowed to flow through this steam coil the tar is heated up to quite a high temperature. The steam is derived from a waste heat plant. The heating of the tar lasts for forty-eight hours, and after that time has elapsed may be guaranteed to hold not more than 2 per cent of water.

The pipe that is employed in the heating process is made in the shape of a U and enters and leaves the tank at the top. It possesses no separate opening for the removal of the condensate, which is carried along with the steam, as the latter escapes from the pipe. Such an arrangement causes an almost continual vibration and to this peculiar circumstance is attributed the success that has been had with this apparatus.

Catechism of Central Station Gas Engineering in the United States

Installment No. 52.

(Continued from last week)

The Griffin Engine

The Griffin engine in its older form, to which the question refers, was what is called a six-cycle engine, that is, one using a cycle giving only one explosion in six strokes or three revolutions. This cycle is as follows:

1. First out-stroke drawing in charge.
2. First in-stroke, compressing charge.
3. Second out-stroke following ignition and explosion, with expansion of the hot gases and performance of work.
4. Second in-stroke, discharge and exhaust of products of combustion.

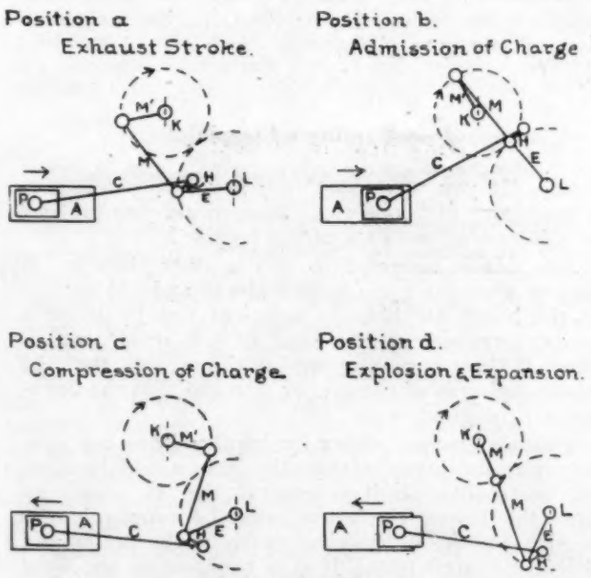
Third out-stroke drawing in pure air to completely expel the products of combustion.

6. Third in-stroke discharging air into atmosphere.

The addition of the last two strokes is for the purpose of thoroughly cleaning the cylinder from the products of combustion of the previous explosion, so that the next charge will not be diluted and weakened by these inert products. Being made double acting, the Griffin engine was not subject to the difficulty of regulating the speed caused by the infrequency of impulses in an engine employing this cycle in a single-acting cylinder, and had quite a success. But it is no longer made as a six-cycle engine, the later types using the Beau de Rochas Cycle in a double acting cylinder.

The Atkinson Engine

The Atkinson cycle engine was designed to secure a greater degree of expansion of the products of combustion than is possible in engines of the Otto type, in which all of the strokes are of the same length, and expansion cannot go beyond the original volume of the charge before compression, and also to make the expansion more rapid. The engine employs the Beau de Rochas Cycle in a single cylinder open at one end, but owing to the manner in which the piston is connected to the motor crank by a series of rods, links and levers, instead of by the usual connecting rod, the whole cycle is completed during one revolution of the crank, and the admission and compression strokes are much shorter than the expansion and exhaust strokes. By this difference in the length of the strokes a greater degree of expansion than is possible in the ordinary type is secured, and the products of combustion are very completely expelled from the cylinder without the necessity of drawing in and expelling a charge of air. It is almost impossible to give a clear idea of the link and toggle motion by which these results are secured with one piston in a cylinder open at one end, without the aid of diagrams, and therefore those given on the cut and the following description of them are taken from "'A Text Book on Gas, Air and Oil Engines," by Bryan Donkin, M. Inst. C. E.: "The distinguishing feature of the Atkinson cycle engine is the link and toggle motion shown in four positions. A is the cylinder and P the piston, C is the connecting rod to the small vibrating



ATKINSON CYCLE ENGINE.

link, H, which, through E, is joined to the fixed point, L. M is the lever connecting through the crank, M_1, to the crank shaft, K. Position (a) shows the end of the exhaust stroke, when the piston is at the inner dead point. The piston moves out, drawing in the charge, and the lever, M, rises, carrying the link, H, with it. At (b) the crank has performed nearly a quarter of a revolution, and H and M are in their highest positions. The energy of motion carries M and M_1, round, forcing down H (position c) and the piston moves in, compressing the charge, but not to the point from whence it started. The clearance space left at the end of the cylinder is slightly larger than before, and the charge is driven into it at a pressure of about 45 lbs. The proportion of compression to admission is as 4 to 5. At the end of this stroke, when the crank has performed another quarter revolution,

the pressure forces the gases up the red hot tube, and ignition follows. The piston is driven out to the extreme limit of the cylinder, M and H are both in their lowest positions (d), and the crank has completed three-quarters of a revolution. The exhaust stroke following is longer than the expansion, since the piston moves in to the extreme end of the clearance space. M and H are raised, the crank completes its revolution, the products of combustion are thoroughly discharged, and the cylinder cleared for the next admission stroke. In the "Cycle" engine the ratio of cylinder volume utilized for compression is 2.5, and for expansion 4.3. The lengths of the four unequal piston strokes are: First forward stroke (admission), 6.3 inches; first return stroke (compression), 5.03 inches; second forward stroke (expansion), 11.13 inches; second return stroke (exhaust), 12.43 inches. These dimensions are for an engine of 2 H. P., nominal."

This engine also proved economical of gas, as was shown by tests made in competition with other engines, among which was the Otto, but its manufacture has been abandoned.

Investigating a Complaint

282. If you were sent to a house to investigate a complaint of "poor gas," how would you proceed to determine the cause of the trouble?

Ans. It is assumed in this answer that it is known that the main in the street and the service in the house are both of sufficient size to insure a proper pressure at the head of the service at all times if there is no stoppage in the service, that the house-piping is of the proper size and that the burners are in good order.

First determine, either by inquiry from the consumer or by investigation, the nature and location of the trouble. If it is general, that is, occurs all over the house, the cause must be sought in the service, meter, or the riser between the meter and the first branch pipe. If it is confined to one floor or to one room, it is only necessary to examine the portion of the system which supplies the floor or room.

Poorness of light due to a uniform low pressure without fluctuation indicates the existence at some point of an obstruction formed by solid matter. A quick sharp jumping of the flame shows an accumulation of liquid at some point, and a slow rise and fall in the size of the flame which takes place at comparatively long and regular intervals is a sign that the meter is overloaded or else sticks at some point. If intelligent information as to the above points can be obtained from any of the inmates of the house, the procedure can be governed accordingly. If this information cannot be had, it will be necessary to secure it by lighting burners in various parts of the house and in sufficient number to test the steadiness of the delivery of the meter, and then determine from observation of the flames the probable cause of the trouble.

Remedying the Trouble

If the trouble is located on a particular floor or in a particular room, examine and clean the burner keys and the bracket swings, and if this does not remedy it explain to the consumer just where you think the stoppage is located and tell him to call in a plumber and have it removed, but do not take off the chandeliers or brackets.

If the trouble is general and seems due to an obstruction of solid matter, take out the plug in the tee where the service comes through the cellar wall and determine whether the service is clear, either by observing the amount in, and the force with, which the gas escapes through the open end of the tee, or else by blowing into the service with the lungs. If it is found not to be clear, try to clear it by the use of a wire and an air-pump, or by the use of gasolene or naphtha followed by the pump. If the service is clear, examine the inlet connection of the meter, and then, if necessary, the outlet connection, being particularly careful to see that these connections have not been flattened in any place so as to shut off the flow of gas.

Testing the Service

When an accumulation of liquid at some point is suspected, test the service as above. The presence of water can be readily detected by the intermittent flow of gas, as well as by the gurgling noise made by the gas as it bubbles through the water. If water is found, blow it out with the pump. If the service is clear, take out the meter drip plugs to see if any water has condensed and lodged in the meter drips.

Test the meter also by leaving it connected on the inlet and taking off the outlet connection, so as to allow the gas a free passing through it, and note the rate and steadiness with which it flows. This meter test should also be made whether an obstruction of solid matter is suspected but cannot be located in the service or the meter connections.

A general trouble that cannot be found in either the service, meter, or meter connections must be in the house piping, and if the stoppage cannot be removed by running a wire up the main riser or by blowing out the exposed pipes in the cellar, locate it as closely as possible, tell the consumer where you believe it to be and advise him to call in a plumber to clean it out. If water is found in the service, notice should be given the main laying department so that the service can be taken up and relaid to a proper grade.

Handling a Leak of Gas Complaint

283. A complaint of a leak of gas is received from a consumer. Assume that it is your duty to investigate the complaint and tell how you would handle the job.

(Fifty-third Installment Next Week)

Humanizing a Gas Company*

Improving public relations by rendering human service

Mary E. Dillon

THIS business of ours has such varied and absorbing problems of engineering, accounting and finance that in their solution we are apt to lose sight of the fact that they constitute just one-half the show—the inside—and no more. Personally I feel that throughout the industry these matters are handled with the highest degree of intelligence and efficiency, and they should be, for they have had the almost undivided attention of the cream of the gas industry for a great many years.

Technique of Dealing With Public

I firmly believe that if the gas industry were to develop and follow a technique in dealing with its public, comparable in excellence with that which it now employs in the manufacture and distribution of its product, the politicians who usually preach only that which is popular, would find other texts to serve their purposes, and our lawyers could take a well-earned rest at their own expense.

Why do so many officers and directors of utilities pay hundreds of thousands of dollars to their attorneys cheerfully, yes and gratefully, and when an advertising man suggests an appropriation of one-tenth the amount, divide that by ten and give it with the air of one who has been greatly imposed upon?

Understanding the Permanent Basis

I have never heard it claimed that litigation led to understanding, and it is only through understanding that we can secure the faith and affection of our public, the permanent basis of that much-coveted good will that we talk about. I would like to see some of our companies, preferably here in the East, where we have been before the courts as well as the commissions almost continuously for the past twenty years, lay aside a fund equal to their rate expense for the past five years and with it get properly acquainted with their public through the best kind of advertising that money can buy.

More Than Courtesy Needed

We teach our employees courtesy; we need more than courtesy. Our relations should invariably be cordial, hospitable and genuinely friendly. It should all begin at the top and should be reflected in every point of contact that we have with the public, from our stationery to our buildings. These buildings of ours are so often used as civic centers or community houses that they should be especially designed not only to serve our commercial needs, but with a home feeling, a beauty, an intimacy and a charm that will express that we are neighbors, neighbors, neighbors, with hearts and souls and feelings, living in their midst—not institutions. A national competition among the leading architects of this country should be productive of some beautiful and original treatments which would be of the greatest benefit to us, and surely to the public.

We are the natural centers of our community and are in a position to render an unique service. Only a careless and persistent misuse of its natural advantages can prevent a company from being considered one of the most valued assets of its locality. My personal experience is that the public is always fair and always reasonable when it knows the case.

Using Company Facilities for the Public Good

With us and with our very cosmopolitan population we have a public that brings most of its troubles to its gas company, and feels free to use that company's facilities for the public good. On a hot Sunday last August we were called upon for materials and tools to mend a broken water main so that a big bathing pavilion would not have to shut down. A few days later the steward of a large restaurant telephoned us that he was in trouble. Part of his brick stack had blown down; would we please arrange with the chimney people whom we thought the best to come and fix it at once, which we did forthwith.

In conjunction with a local printer, there is issued each year a directory, compiled from the company's lists, and a free copy is distributed to each household in the district.

An official station of the Weather Bureau has been installed on the roof of our building, where local temperatures are noted and a rain gauge kept that is the basis of rain insurance settlements, which are most important to our neighbors and clients, the showmen.

The company's large show room and commercial offices are cleared frequently to accommodate citizens who wish to discuss local assessments, street widenings, cleaner streets, better babies, Christmas baskets, handling of traffic, and the proper length of bathing suits. Some weeks ago a hundred boys and girls of the Junior Clean-Up Committee met to discuss ways and means over plates of ice cream. And occasionally there is a neighborhood dance for a group of young people or a reception for a graduating class of the local school. I have in mind particularly the one a few years ago which presented

*From an address delivered before the sixth annual convention of the American Gas Association.

me with a diploma at the regular exercises and now refers to me as a member of the class. The diploma is one of my treasured possessions.

The Gas Company a Neighbor

Sometimes our building is selected because members of our staff are officers or members of the associations interested in a movement; more frequently we are asked to extend our hospitality because people like to come there. They feel at home and know that we like to have them; and of course the fact that we are non-political and non-sectarian is a large factor. All this naturally entails extra work, tact and social sense, and it must always be true that our interest must be pure neighborliness, with no desire to exploit or impose upon this bond of friendship.

At one time twenty-odd charitable societies of a certain faith met here on neutral ground for the purpose of effecting an amalgamation. That they asked the company's representative, of a different faith, to act as chairman while they adjusted their various differences was indeed a great tribute to the company's reputation for fairness.

Queerly enough, one of the things that is rarely discussed by its customers, either privately with the management or publicly at meetings, is gas, and when they do discuss it I find that they necessarily regard our statements in the light of their other associations with us.

The Public Is Half Feminine

We consider a well equipped domestic service department as a demonstrated necessity Ours has proved invaluable both from a service and a public relations standpoint. In addition to the usual functions of such a department, we edit a housewives' column in the local newspaper and are arranging to give talks on different phases of home and budget making as part of the program at women's political meetings which are held at night in their clubhouses.

For many years our industry has regarded the American public as wholly masculine, when it is at least 50 per cent feminine, this half also being citizens and voters who have an equal voice in deciding what shall be done with or to us by our legislators assembled. As customers they form the great majority of those who are directly interested in us as servers of gas, for men may more often hold the purse, but the disbursements are made by women.

Reaching Women in Groups

That it is important and possible to reach women in groups can be seen when it is appreciated that in New York State alone there are over 800,000 club women, who are always glad to be kept in touch with matters affecting their welfare. Many phases of this industry certainly come within that scope, and we should have women employees who are qualified to discuss them with other women.

That our women customers go out of their way to take an active interest in these matters was demonstrated very forcibly to me at a number of so-called gas protest meetings in one of the big cities, arranged by professional agitators, when I found that over 80 per cent of those in attendance were women. The subject under consideration was a change of standard. These women had not been correctly informed regarding it and had no real knowledge of it. They had come because they sincerely believed that they had individual grievances —high bills, etc. What was needed was full enlightenment by a well informed member of their own sex. There is a broad field here, and my personal feeling is that it can very well be covered by college women trained in social service work.

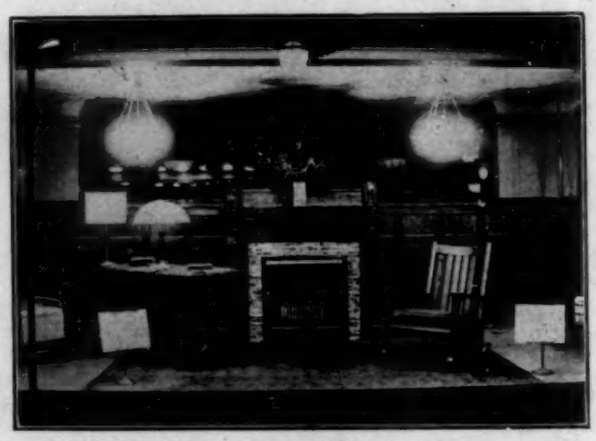
Use Women in Public Relations Work

The distinguishing qualities of women are social, practical and utilitarian. Let us use these qualities of our women employees to better advantage in our public relations work. Already women's sections of committees on public utility information have been formed in a few of the states. I hope that this movement as it affects our industry may soon become national.

Now as to the people of both sexes within the organization, in whom our real strength lies, both as enthusiastic workers and as messengers to the public.

The choice of officers and the education and treatment of employees is of the utmost importance, for the corporation is bound to assume the personality of its composite personnel.

The gas man has a responsibility and must have an interest covering the entire twenty-four hours



The Space Heater Enthroned

in every day, and gas company employees have it from the laborer up. The exactions of this severe service should be recognized and adequately rewarded.

For some reason the works and street employees have been regarded in many companies as a class apart, and often many of them have been designated by numbers. There are no unimportant positions in a gas company, and I feel that we should know each man by name, whether he digs in the ditch or is the engineer who plans the work. All permanent employees, works, street, office or shop, should be treated with equal consideration in respect to vacations, sick leave with pay, etc., and laborers who have given a year's continuous service may very well be regarded as permanent employees.

There are still many companies who have made no provision for adequate pension plans. Now is the time to do this, while rate structures are being determined, for this is a proper operating charge that should be included in justice to the 75,000 men and women who are giving their life work to this great public service.

SIMPLIFIED COOK BOOK FOR GAS MEN

Mrs. Anna J. Peterson, Director Home Service Department of the Peoples Gas Light and Coke Company of Chicago, has recently compiled the recipes she uses in connection with her lectures in the cooking classes and in broadcasting over the radio. This book is published under the title of "Simplified Cooking." We use Mrs. Peterson's own words best to describe this book:

"We call the book 'Simplified Cooking' because it is simple and easy! We made it simple by discarding long lists of recipes, much alike, which are confusing; instead, we worked out the basic or standard recipe in each class of foods. These you will find followed by many variations—a new plan you see, which makes your cooking very simple and easy and yet gives a great variety of delicious dishes.

"Then you will find very clear directions, accurate measurements, the exact temperature and the exact time of cooking also the number each recipe will serve. If you will just follow the directions you cannot make a mistake, even though you have never cooked at all before. You will find all the 815 recipes so delicious that you will want to try every one in the next year or two. Your family will be so pleased with the meals that I think you will simply live by this book.

"It's more than a cook book, too—it's a Handbook of Every Day Meal Preparation. In it I try to help you just as if I were in your own kitchen. In the first chapter I show you how to plan appetizing, wholesome, well-balanced meals with plenty of vitamines. Read my talks at the beginning of each chapter; they are right to the point—and interesting. Note the chapter headings under the three parts: 'Part 1. Three Meals a Day; Part 2. For Baking Days; Part 3. Special Articles.'"

Gas companies who already have Home Service Departments, as well as those who contemplate installing them, will find many valuable suggestions in Mrs. Peterson's book—which sells for $1.50—as her recipes are not only wholesome and appetizing, but are invariably economical to prepare. The book also helps to educate the housewife in the proper care and more frequent use of the gas range.

SMOKING HAMS BY GAS AND SAWDUST IS LATEST AND MOST EFFICIENT PRACTICE

New "Curing" Process for All Kinds of Meats Less Expensive and Still Produces That Old-Time Sweet Taste

Millions of pounds of meat, hams and bacon, sausages of every size, fish and a dozen other things, are smoked every year in this country, and in their preparation manufactured gas is now playing an important part.

Hickory and maple wood are best for smoking, but if they had to be used as logs their cost would add heavily to the price of anything smoked.

A decade ago experiments were made with gas and hickory sawdust, says the North and South Carolina Public Utility Information Bureau. These proved so successful that the use of gas for this industrial purpose has doubled in the past three years, and the packing companies of Chicago alone now consume more than a billion cubic feet of gas a year in this branch of the industry.

The meat to be smoked is hung in tiers in a tall shaft, at the bottom of which are rows of gas burners set in a concrete floor. Hickory or maple sawdust is piled on the floor and the gas flames are directed against it. The smoke from the sawdust permeates the meat hanging above it, imparting the same pungent flavor that came from the old-fashioned farm smokehouse.

It is an intresting story, how the human race began to use smoked meats. The legend says:

Ten thousand years ago a naked savage made a kill, built a fire to cook what he wanted to eat and by accident hung the rest of the meat where the smoke could reach it. A prowling bear frightened him away and for days the meat hung over the smouldering log, where thieving animals could not get it. When the owner next passed the spot he was hungry, and the piece of meat, instead of spoiling, had taken on a golden brown color, and the fragrance of wood smoke. Being hungry, he tasted it, and found it good. And ever since then smoked meat has been an important item in the life of every nation, savage and civilized.

THE ESSENTIALS OF GAS PROGRESS

(Continued from page 6)

our investment we must have a scientific and economically correct and sound rate structure and schedule, with the commodity charge low enough to compete with other fuels.

The three points are of such significance that it is difficult to indicate the order of importance. In a way, they are interdependent. I believe, however, that the most important is the one of rational and economically sound standards of gas quality, referring particularly to the B.t.u. density, that is, the number of B.t.u.s per cu. ft.

Most Efficient Gas in Utilization

In seeking for the real correct answer to this question, we should start at the point of utilization of the gas and determine what gas is the most efficient in utilization per B.t.u.

Our organization has done a great amount of research in the study of this problem and our consideration shows to us quite definitely that the most efficient gas of utilization is one that is made up largely of simple and stable gases, such as hydrogen and carbon monoxide. These gases, although they have a relatively low B.t.u. density, have very high flame temperatures and very satisfactory flame propagations, both essential to high efficiency of utilization.

The ordinary gas has, in addition to hydrogen and carbon monoxide, a considerable percentage of what may be generally classed as hydrocarbons. These hydrocarbons have much greater value when removed from the gas and marketed as raw materials to be made into chemicals, dye stuffs, etc., than they have as fuel if left in the gas.

Why the Gas Is Ideal

It appears from the above that a gas made up largely of hydrogen and carbon monoxide is the ideal gas, for two reasons:

1. Its efficiency of utilization per B.t.u. is of the highest.
2. In its production the hydrocarbons, instead of being left in the gas, will be removed and disposed of through markets where the price of each is considerably higher than is its value in the gas. The result of this is certain to be the lowest production cost of gas per B.t.u. However, this sort of gas would probably be of B.t.u. density between 300 and 350. Such a standard of quality is today only permitted in a few localities.

Very fortunately for the gas industry, the states of Colorado, Alabama and Washington have within the last year made epoch-making rulings permitting the gas companies in those states to make gas of whatever B.t.u. density is demonstrated to give satisfactory service to the customers. Such a provision may be called a "Selective Standard," and it gives each company complete latitude to make any kind of gas from any materials by any process, the only stipulation being that satisfactory service shall be rendered. Such rulings are, according to our belief, the most helpful that have ever been made in the history of the gas industry.

Importance of the Selective Standard

It, therefore, is of the utmost importance that regulatory bodies be convinced of the wisdom of giving your companies here the latitude of selecting their own B.t.u. densities and thus set aside an old precedent that unquestionably interferes perceptibly with the proper expansion of the gas business.

Second in importance of the three big factors is the one of correct rate structure. I doubt if it is necessary for me to elaborate very much on the three-part rate, which, as you no doubt all know, was originated many years ago by Mr. Doherty. The A. G. A. has taken official recognition of this form of rate and has gone on record as recommending it for general use.

We have now in use in practically every one of our properties a rate which has been figured on the three-part rate structure and principal. In a number of cases, however, we have been caused to concede temporarily to local wishes or spirit and install the rate for domestic purposes as a two-part rate, or what you probably know as a rate with a service charge.

Importance of Three-Part Rate

So much has been said and written on the three-part rate and modifications of it that I will not take your time to go into details again. I do believe that your continued study and analysis of this form of rate will cause you to see the wisdom of installing it, and when you do install it you will realize the great advantage that results from its use, not only for industrial customers, but also for domestic customers. In this connection, I suggest your carefu

A Mammoth Gas Burner

study of the 1921 report of the Rate Structure Committee of the A. G. A.

There is no doubt but that the gas business today, even with the present standards of quality, and the present gas-making equipment, could be on a much higher plane with respect to gross and net earnings, if we had on our lines all of the business that can be secured with existing facilities.

Disadvantages of Flat Rate

The ordinary flat rate in use certainly does interfere quite definitely with the sales of gas for industrial and house-heating purposes. I believe I am safe in saying that in nearly every instance where a flat rate is in use, the production cost of the gas is not more than one-third of the selling price. If, therefore, the items represented by the other two-thirds are properly pro-rated, with respect to the number of customers and the demand of each, the commodity charge would be only slightly in excess of the production cost. Experience and countless analyses show that the customer's charge should be $12 per year per customer. With the commodity charge being approximately the cost of gas in the holder corrected for unaccounted for, the remaining expenses, return on investment, etc., should be properly pro-rated through the demand charge.

Gas sold at such a rate certainly could compete satisfactorily with other fuels in many industrial situations; particularly in the relatively small ones.

Producing Maximum Number of B.t.u.s per Dollar

The third big problem is one which is bound to be solved, especially after the first two have made substantial progress toward solution. This is the one of producing the maximum number of B.t.u.s per dollar. So far as we know, the problem of complete gasification has not yet really been entirely solved, but there is very little doubt but what it will be, and in the not far distant future. The efficient operation of a complete gasification plant means production of a relatively low B.t.u. gas along the lines mentioned in my first point.

The three above points appeal to me as being absolutely essential. There are, of course, a number of others, many of which are dependent upon the above or resultant from them.

The Economic Basis of Gas Affairs

I sometimes get the idea that gas men, particularly the engineers and executives, do not regard their affairs from the standpoint of sound economics. While we are in business of rendering public service and should never ignore that, we are also in business to make a fair return on the fair value of our property.

When I mention the question of economics, I am thinking particularly of a design of gas distributing system. Nearly 60 per cent of the value of your properties is in the distribution systems and yet it sometimes does appear that surprisingly little

thought is given to the most economic design of these systems, to the end that for the minimum of investment the maximum conductivity of the mains and the correct distribution of the load will be accomplished.

During the last two or three years committees of the American Gas Association have given much thought and have done a lot of work on this problem of correct distribution design and your careful study and consideration of the very valuable papers and discussions that they have presented at the association meetings will, no doubt, be profitable to you.

Prepare for the Distant Future

One sometimes wonders if there is not a tendency to look ahead for only the next year, or two or three, instead of for twenty-five years, or even more. We ought to have constantly in mind the question, Are we justified in making the business grow, and, if so, why? I would not for a minute have you feel that I think the answer to this is in the negative.

I am 100 per cent enthusiastic about the business and feel that it has a future as big as any industry.

I raised the question above, however, to undertake to make you realize that we should project ourselves into the future and be sure that we are today lending our support to those problems which will make the gas business constantly and increasingly prosperous.

Unless you are giving thought and real hard study and also are giving impetus to the several problems mentioned earlier in the talk, among others, I do not believe you are looking into the future and planning both for proper growth of the industry in our time and for succeeding generations.

Possibly you have wondered why I have not said more about extending markets and seeking new fields for the sale of gas. Naturally I regard that as a problem of the utmost importance. On the other hand, it seems to me that if we solve these problems that I have mentioned previously, the one of increasing our sales and introducing gas for many purposes for which it is not now used will result almost automatically. At least, it will with the sales effort that we are well prepared to make.

Gas Is the Ultimate Fuel

In conclusion, I might just mention that we fully believe that gas is the ultimate fuel. There is no reason why any coal should be burned as such. It should first be gasified and then all of the by-products each put to its greatest use, leaving as gas only those ingredients that have no greater value for other purposes. Through such a procedure the gas can be produced at prices so low that it can, with correct rates and by proper and efficient application, displace practically all solid and liquid fuels.

Our generation may not see the complete accomplishment of this, but surely a partial accomplishment can be made very profitable to the gas men of today.

BLUE WATER GAS

(Continued from page 2)

It was found that, owing to the high flame temperature of the gas, great care had to be exercised in using this gas under vessels on the gas stove, as the small intense flame impinged on the bottom of the vessel and scorched any food that might be cooked therein. The inside of the vessel showed how many jets of gas were in the burner. It demonstrated that blue gas is not the ideal gas for displacing natural gas, but owing to its intense flame temperature and shortness of flame it is the ideal gas to mix with natural gas.

Mr. Carl Dellwik, chemist, who came to this country with the Fahnehjelm burner, made some interesting experiments with burners and welding

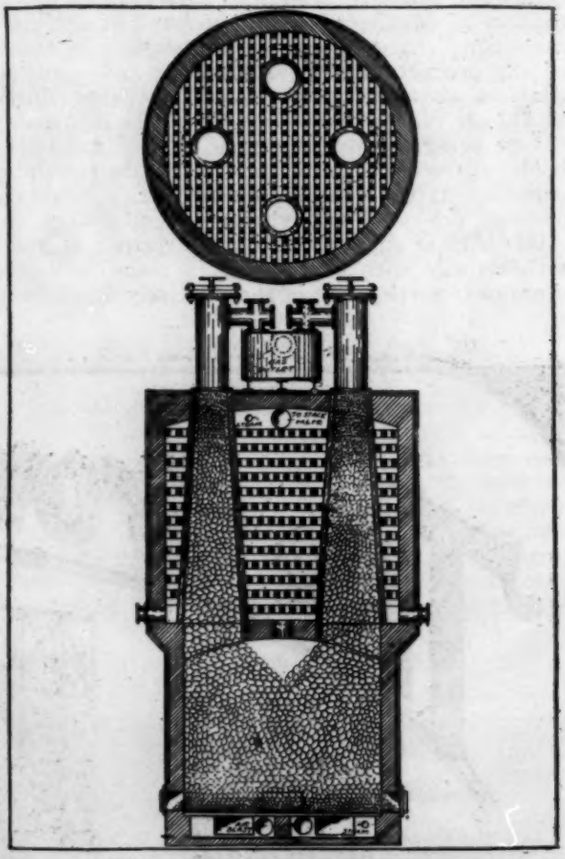


Fig. 3—A Four-Retort Machine

products and after the closing of the blue gas plants here he returned to Europe and made many successful installations of Dellwik blue gas generators for welding and other industrial uses. It was proven that this gas is ideal for welding iron and steel pipe and boilers, as well as for most all of industrial uses on account of its high flame temperature and small amount of air or oxygen required for its combustion.

Current Market Prices

COALS (By Courtesy of Coal Age)

A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

High Volatile, Eastern	Market	Price
Pool 54-64 (Gas Standard)	New York	$1.40 to $1.65
Pittsburgh screened gas	Pittsburgh	2.30 to 2.50
Pittsburgh gas, mine run	Pittsburgh	2.00 to 2.25
Kanawha lump	Columbus	2.10 to 2.50
Kanawha mine run	Columbus	1.45 to 1.65
West Virginia lump	Cincinnati	1.90 to 2.50
W. Virginia gas mine run	Cincinnati	1.40 to 1.65
Midwest		
Indiana 4th vein lump	Chicago	3.00 to 3.25
Indiana 4th vein mine run	Chicago	2.25 to 2.50
South and Southwest		
Big Seam lump	Birmingham	2.50 to 3.25
Big Seam mine run	Birmingham	1.50 to 1.75
Southeast Kentucky lump	Louisville	2.50 to 2.75
Southeast Kentucky mine run	Louisville	1.35 to 1.50

B. Anthracite.

(Spot prices F. O. B. mines, gross tons),

	Market	Freight rates	Independent	Company
Egg	New York	$2.34	$8.25 to $8.75	$8.75 to $9.25
Egg	Philadelphia	2.39	9.45 to 9.75	8.80 to 9.25
Egg	Chicago (net tons)	5.06	8.17 to 8.40	8.08 to 8.20

COKE (By Courtesy of Iron Trade Review).

Connellsville, furnace	$4.25 to $5.00
Wise County, furnace	4.00 to 4.25
Alabama, furnace	4.00 to 4.50
Foundry, Newark, N. J., del.	10.41
Foundry, Chicago, ovens	10.75
Foundry, Boston, delivered	11.50
Foundry, St. Louis	11.00
Foundry, Granite City, Ill.	9.00
Foundry, Alabama	4.50 to 5.25

PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)

(Prices at wells, per bbl.)

Pennsylvania—Ohio—West Virginia.	
Cabell, West Virginia	1.45
Corning, Ohio	1.50
Lima	1.58
Pennsylvania	$2.75 to 2.85
Wooster, Ohio	1.40
Indiana—Illinois.	
Illinois	1.37
Indiana	1.38
Oklahoma—Kansas.	
Mid-continent (low gravity)	.75
Gulf Coast.	
Gulf Coast, Grade A	$1.50
Gulf Coast, Grade B	1.25

GAS OILS.

Gas Oil, Bayonne, bulk gal.	5¼c
Gas Oil (32-36) Oklahoma, gal.	3⅜ to 3½c
Gas Oil (32-36) Gulf Coast, gal	3¾ to 4 c

PIPE AND FITTINGS—CAST IRON GAS PIPE.

(By Courtesy Iron Trade Review.)

Four-inch, Chicago	$57.20
Six-inch and over, Chicago	53.20
Four-inch, Birmingham	$49.00 to 50.00
Six-inch and over, Birmingham	45.00 to 46.00
Four-inch, New York	65.50 to 66.50
Six-inch and over, New York	60.50 to 61.50
Standard fittings, Birmingham, base	115.00
6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20	

BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug

Ammonia aqua, 16 deg. drums lb.	5 to 5¼c
Ammonia aqua, 20 deg. drums lb.	6¼ to 6½c
Ammonia aqua, 26 deg. drums lb.	6½ to 7 c
Ammonia squa, anhydrous cylinder, lb.	30 to 36 c
Ammonium sulphate, bulk F. O B. Works, per 100 lbs.	$2.70 to $2.80
Potash prussiate, yellow casks, lb.	16½ to 16¾c
Potash prussiate, red casks, lb	37 to 38 c
Soda prussiate, yellow casks,	9¼ to 9½c
Soda sulphocyanide, barrels, lb.	45 to 55 c

COAL TAR BASIC PRODUCTS.

(By Courtesy of Oil, Paint and Drug Reporter)

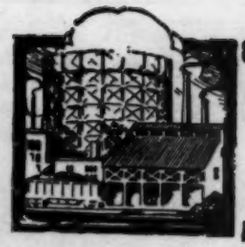
Benzol C. P. tanks, works, gal.	24 to 25c
Benzol, drums, gal.	30c
Benzol, 90% tanks, works, gal.	23c
Benzol, 90% drums, gal.	28c
Napthalene, flake, barrels, lb.	5½ to 6 c
Napthalene, dyestuff bags, lb.	5 to 5½c
Solvent Naphtha, water white works, gal.	24 to 25c
Solvent Naphtha, drums, works, gal.	29 to 30c
Toluene, C. P. tanks, works, gal.	31c
Toluene C. P. drums, works, gal.	36c

Crude Oil

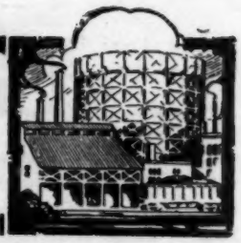
The gross daily average of crude oil production in the United States increased in the week ended December 20, 9,100 barrels. The American Petroleum Institute estimated production for the week at 1,986,400 barrels, as compared with 1,977,300 barrels for the preceding week. Daily average production east of California was 1,375,900 barrels, as compared with 1,374,300 barrels, an increase of 1,600 barrels.

Gas Oil

Gas oil was selling in larger volume. Continued gain in export buying of fuel and gas oils was noted in November. Exports during the month were valued at $4,304,646, against $2,659,865 in November last year. Exports for the eleven months ended November 30 were valued at $45,542,082, against $31,914,768 for the same period last year.



NEWS OF THE GAS INDUSTRY



Changes Made In A. G. A. Personnel

N. T. Sellman Resigns, H. W. Hartman Promoted and R. L. Burdick and J. W. West, Jr., Join Staff

Important changes in the personnel of the headquarters staff of the American Gas Association, effective January 1, were acted on at the December 17 meeting of the executive board.

Nils T. Sellman, assistant secretary-manager, leaves the association on January 1 to become engineer of utilization of the Consolidated Gas Company of New York, in direct charge of the Department of Utilization. Mr. Sellman joined the staff of the association in 1921 as service engineer. In 1923 he was appointed assistant secretary-manager, which position he held until his resignation.

On action on his resignation, the executive board said:

"The board has received and accepts with regret the resignation of Mr. N. T. Sellman as assistant secretary-manager of the American Gas Association. His service of three years and three months had been entirely satisfactory to the association and he has demonstrated his ability, his loyalty and his power for growth and development. It is a pleasure to agree on our part with Mr. Sellman's statement that his work with the association has been 'most ideal, cooperation and unified effort having prevailed at all times."

"The board particularly desires to record its appreciation of Mr. Sellman's activities in reference to the establishment of an appliance testing laboratory. It is gratifying to know that he desires to continue to be active in this work and that his future employers also wish him to be of any possible service to the association.

"The board extends him its best wishes for success and happiness in his new field."

H. W. Hartman, secretary of the Accounting and Technical Section, becomes assistant secretary-manager on January 1, filling the vacancy caused by Mr. Sellman's resignation. Mr. Hartman has been a member of the headquarters staff since the organization of the American Gas Institute, and before this was connected for several years with the engineering department of the Peoples Gas Light and Coke Company of Chicago.

Announcement also is made of the appointment of R. L. Burdick of New York as secretary of the Commercial Section, to succeed Louis Stotz. Mr. Burdick comes to his new work with a valuable background of experience in sales merchandising and advertising. For three years he has been assistant secretary of the Associated Business Papers, Inc., and previous to that time was with Forbes Magazine, the Magazine of Wall Street, and several advertising agencies.

Mr. Burdick has specialized in the formation and carrying out of sales campaigns, advertising connected therewith and general sales promotional work. He is the author of some forty articles on merchandising and selling which have appeared in Printer's Ink, Sales Management and Advertising Fortnightly. He is also the author of a text-book on trade sales promotion.

On January 1, the headquarters staff will be further augmented by the addition of John W. West, Jr., chief engineer of the State Corporation Commission of Virginia. Mr. West will become a service engineer of the association. He is a graduate of the Virginia Polytechnic Institute. He joined the Virginia commission in 1918 as assistant engineer and has been chief engineer for the last three years. Mr. West is a nephew of Lieutenant-Governor J. E. West of Virginia and of Judge J. F. West of the Supreme Court of Virginia.

Gas Company to Install New Set

Saranac Lake, N. Y.—Contracts were signed yesterday by Ernest Grubb, president of the Mountain Gas Company, for the purchase and installation of complete new gas-making equipment to be used in connection with the present equipment at the local plant.

The purchase was made from the Steere Engineering Company of Detroit, Mich., which concern recently installed the backrun process on the present set.

New Jersey Gas Association to Hold Meeting

Event—Mid-year meeting of New Jersey Gas Association.

Time—10 a. m., Friday, January 23, 1925.

Place—Public Service building, Sip avenue, opposite Summit avenue station, Jersey City, N. J. Pennsylvania Railroad to Hudson and Manhattan Transfer. Tube train to Summit avenue station.

Contracts Closed

The Cruse-Kamper Company has recently closed the following contracts: A 500,000 cu. ft. holder for Point Breeze, Philadelphia; a 340,000 cu. ft. holder for Havana, Cuba; a 2,000,000 cu. ft. holder for New Britain, Conn., and for a 5,000,000 cu. ft. holder for Birmingham, Ala.

The Own Your Home Exposition Movement

Chicago, Ill.—The importance of gas as a utility in the construction and furnishing of the modern home will be demonstrated by many service corporations and well-known manufacturers and dealers in the gas divisions of the annual "Own Your Home" expositions, to be held this spring in Chicago, New York, Philadelphia and Buffalo.

The same management that has so successfully conducted the New York and Chicago expositions for many years has added Philadelphia and Buffalo this year, co-ordinated the dates to enable manufacturers to travel the circuit with one display, and secured for them the approval of the local real estate board and operating licenses from the National Association of Real Estate Boards. Last year the National Association agreed to issue licenses to all such expositions and shows held throughout the country that conformed to certain rigid rules of conduct, and the Chicago and New York expositions were immediately awarded the first two licenses. This plan of central control, adopted in an effort to raise the standard of such expositions, received the approval of over forty national allied trade organizations and associations.

Strong Gas Appliances committees have been formed in each city to supervise the part played by this industry in connection with all the other industries represented, and the progress of the gas industry during the past year will be shown in spectacular and educational displays. Some entirely new plans for presenting the latest improvements in gas consuming units, especially featuring house-heating equipment, have been made by all the Gas Appliances committees.

New Method of Display

"The old method of displaying a row of appliances has been abandoned by the members of my committee," states C. A. Luther, assistant general manager, Peoples Gas Stores of Chicago, chairman of the Chicago Gas Appliance Committee. "Visitors to the expositions must be convinced that home life is attractive if they are to be encouraged to buy real estate or gas ranges, and the displays in this division will be planned with this thought in mind. We intend to emphasize the part the gas industry plays in making the modern home comfortable and attractive."

Mr. Luther also states that he can trace at least 67 sales of house heating equipment, costing from $500 to $3,000, to the exhibit of the Peoples Gas Light and Coke Company at the Chicago Exposition last year.

In Philadelphia, the management has secured an assistant managing director and manager of the Philadelphia Exposition, Louis Stotz, former assistant secretary and manager of the Manufacturers' Section of the American Gas Association.

In New York City, the Consolidated Gas Company will exhibit for the first time this year, and the Gas Appliances committee is considering giving a series of lectures by a noted household expert on the economy and uses of various gas units in the home.

In Buffalo, L. S. Bigelow, publisher of "Gas Industry," is chairman of the committee, and H. S. Norris, secretary of the Iroquois Gas Corporation, is vice-chairman.

The Philadelphia committee includes: Stanley Grady, secretary, Roberts & Mander Stove Company, chairman; C. E. Bartlett, president, Bartlett & Co.; R. W. Trump, Philadelphia Stove Company, and C. W. Wardell.

The New York committee includes: William M. Crane, chairman, chairman of board of directors, Standard Gas Equipment Corporation (Vulcan Division); James V. Landreth, Kompak Company; M. C. Robbins; Harold E. Humphrey, General Gas Light Company; G. M. Karshner, superintendent Domestic Appliance Division, Consolidated Gas Company of New York.

Chicago Committee

The Chicago committee includes: C. A. Luther, chairman, assistant general manager, Peoples Gas Stores of Chicago; E. V. Daily, James B. Clow & Sons; W. A. Framke, Reliable Stove Company; Ernest Martin, Geo. M. Clark Co.; C. O. Frary, General Appliance Sales Corporation; A. T. Wallace, General Gas Light Company; C. E. Bartenbach, A. B. Stove Co.; W. A. Smith, Cribben & Sexton Company; J. Ratcliffe, Michigan Stove Company; H. Dummett, Humphrey Company; Reid Cameron, Lovekin Water Heater Company; Fred Rix, Eureka Water Heater Company; Harry D. Schall, Baltimore Gas Appliance Company; Frank Coulter, McDougall Company; John Toomey, Rathbone, Sard & Co.; E. J. Caspers, Chicago Gas Appliance Company; Raymond Hurley, Hurley Machine Company; W. E. Derwent, Geo. D. Roper Corporation; William T. Rasch, A. H. Wolff Gas Radiator Company; Fay Grow, Time-O-Stat Company; W. L. Thompson, Columbus Heating and Ventilating Company; George Knapp, Pittsburg Water Heater Company; Arthur Friedman, Cleveland Heater Company.

In Chicago, the first exposition on the circuit, the following firms have already taken space: George H. Clark Company, Crane Company, Cribben & Sexton Company, Ever Hot Heater Company, General Appliance Sales Corporation, Hurley Machine Company, Lovekin Water Heater Company, Michigan Stove Company, Northwestern Steel and Iron Works, Peoples Gas Light and Coke Company and the Reliable Stove Company.

The Chicago Exposition will be held in the Coliseum, March 21 to 28, inclusive, under the auspices of the Chicago Real Estate Board.

The New York Exposition will be held in the 69th Regiment Armory, April 18 to 25, inclusive, under the auspices of the real estate boards of the Metropolitan District.

The Philadelphia Exposition will be held in the Commercial Museum, May 9 to 16, under the auspices of the Philadelphia Real Estate Board.

The Buffalo Exposition will be held in the Broadway Auditorium, May 30 to June 6, under the auspices of the Buffalo Real Estate Board.

Gas Main Authorized for Watervliet and Colonie

Albany, N. Y.—The Public Service Commission today approved franchises granted to the Adirondack Power and Light Corporation by the city of Watervliet and the town of Colonie, permitting the construction of a gas transmission line through the town and city. No sales of gas are to be made either in the town or city, the pipe line being used to carry gas from the Hudson Valley Coke and Products Corporation at Troy to Schenectady, where it will be distributed. Consent to cross the Hudson River with the line was obtained from the United States Government.

The main will be of 12-inch welded steel. The estimated cost in Colonie is $15,000 per mile, and there will be about nine miles of the line in this town. There will be about 1,000 feet of main in Watervliet, and the cost here will be $4 a foot. The Adirondack company has a 20-year contract with the Hudson Valley Coke and Products Corporation for a supply of gas, and the new plant at Troy, which will furnish the gas, is expected to be in operation in September or October, 1925.

Southern Counties Gas Company Reports Earnings

Los Angeles, Calif.—The Southern Counties Gas Company of California, through Blyth, Witter & Co., reports net earnings (after operating expenses and taxes) for the month of October, 1924, as $44,776, as compared with $1,202 for October, 1923. Net earnings for the 12 months ended October 31, 1924, were $1,263,986, as compared with $1,097,549 for the same period last year. The balance after bond interest charges was $726,515, an increase of $99,552 over the 12 months ended October 31, 1923.

The Southern Counties Gas Company serves the great suburban territory adjacent to Los Angeles, extending as far north as Santa Barbara and Montecito and south to Orange County. Chief among the fifty odd cities served are the lowing: Santa Ana, Anaheim, Fullerton, Whittier, Monrovia, Pomona, San Pedro, Wilmington, Santa Monica, Venice, Culver City, Ventura, Oxnard, Santa Paula and Santa Barbara.

Addison Gas Rates Approved

Albany, N. Y.—The Public Service Commission has approved a new schedule of the Addison Gas and Power Company for gas service supplied in the village of Addison, N. Y. Schedule filed to become effective December 1, 1924, provides rate of 95c (increase 14c) per M. cu. ft. for natural gas consumed for fuel, lighting and power. Minimum charge 95c (increase 14c) per month. Prompt payment discount same as heretofore (5c per M. cu. ft. or 5c from maximum bill).

Clare N. Stannard a Real Santa Claus

The Big Brothers Club of Denver were discussing some of the articles they needed for the kiddies' packages for Christmas, so that Santa Claus might not overlook some kiddie whose parents did not know Santa's address, so that the proper invitation might be extended.

Clare N. Stannard, vice-president and general manager of the Public Service Company, grinned, and then he smiled, for well did he remember with what great joy the kiddies greeted his last Christmas donation. Over to the Denver mint went Clare and out he came with another bag containing 400 bright, new silver quarters, and back to the meeting went Clare.

That's the Christmas spirit.

A New Liquid for Coating Top Burners and Grids of Gas Ranges

The L. S. French Laboratories, 178 Freylinghuysen avenue, Newark, N. J., recently placed on the market a fireproof, odorless bronzing liquid for rustproofing iron. It is specially adapted for use in finishing top burners and entire grids of gas ranges. Used with aluminum powder, it affords a light, clean finish and will not burn off. It also is used as a protective coating on the linings of ovens. It dries quickly and is waterproof, as well as acid proof.

Elmira Rates Approved

Albany, N. Y.—The Public Service Commission has approved rates of the Elmira Water, Light and Railroad Company for gas service supplied in the city of Elmira and towns of Elmira and Southport, N. Y. Schedule filed to become effective December 15, 1924, provides rate of 10.5 per 100 cu. ft. for mixed gas, available to all consumers for light and fuel. Minimum charge, $1.05 per month. An excess of 10c per thousand cu. ft., added to minimum bill, will be charged if bill is not paid within ten days from its date. Prepayment meter rate, 10.5c per 100 cu. ft. Rate heretofore in effect: 95c per thousand cu. ft.; minimum charge, $1 per month. Excess of 5c per thousand cu. ft. or 5c added to minimum bill charged when bill was not paid within ten days from date.

Hearings Before the Public Service Commission

Albany, N. Y.—A hearing was held before the Public Service Commission on the application of the Adirondack Power and Light Corporation for the fixing by the Commission of new rates to be charged for gas in Saratoga Springs, N. Y. An order of the Public Service Commission fixing rates for gas in Saratoga Springs is now being revised in the Appellate courts, and it is sought by the present application to have temporary rates established until the action of the courts has been determined.

The company at today's hearing furnished figures covering the operating expenses of the company for the past two years and also estimates for the year 1925.

At the conclusion of today's hearing an adjournment was taken to a date to be fixed later.

Illinois Power & Light Declares Dividend

Chicago, Ill.—Illinois Power & Light Corporation has declared the regular dividend for the quarter ending December 31 of 1¾ per cent upon the 7 per cent cumulative preferred stock and 1½ per cent on the 6 per cent participating stock, payable January 2 to stockholders of record December 10.